

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL ADJUSTMENT ADMINISTRATION
SOUTHERN DIVISION

INSTRUCTIONS RELATING TO THE ELECTION OF COMMITTEEMEN, DELEGATES, AND OFFICERS AND THE ORGANIZATION OF 1940 COUNTY AGRICULTURAL CONSERVATION ASSOCIATIONS

I. GENERAL

1. **Purpose.**—The purpose of the 1940 county agricultural conservation association, hereinafter referred to as the "1940 association", as organized under the Articles of Association, form ACP-71, revised on September 14, 1939, and these instructions, shall be to cooperate with the Secretary of Agriculture, the Agricultural Adjustment Administration, and other agencies of the Department of Agriculture in carrying out the provisions of sections 7 to 17, inclusive, of the Soil Conservation and Domestic Allotment Act, the Agricultural Adjustment Act of 1938, the Federal Crop Insurance Act, the Sugar Act of 1937, any amendments to such acts, and such other Acts of Congress as the Secretary of Agriculture may designate. The association shall not engage in any other activity.

2. **Time of elections.**—Elections of community committeemen of the 1940 association and of delegates to the county convention for the election of county committeemen of the 1940 association are to be held in December, 1939.

3. **Tenure of committeemen and officers.**—The present committeemen and officers of the 1939 county agricultural conservation association, hereinafter referred to as the "1939 association", will continue through December 31, 1939, to perform all the duties required of such committeemen and officers in connection with carrying out the provisions of all programs being administered under the acts cited above. Committeemen, delegates, and officers elected to serve in connection with the 1940 association shall take office and assume their duties effective as of January 1, 1940, and unless otherwise provided shall serve until December 31, 1940, or until their respective successors have been elected and have qualified; except that the delegates to the county convention shall assume their duties immediately upon being elected and shall hold their county convention prior to January 1, 1940, for the purpose of electing the county committee of the 1940 association. The full name of such committee shall be the County Agricultural Conservation Committee.

4. **Organization.**—The plan of organization and operation of the 1940 association is substantially the same as that of the 1939 association. The new Articles of Association, Form ACP-71, as amended on September 14, 1939, and these instructions supersede the Articles

of Association, Form ACP-71, as amended July 28, 1938, and the related instructions, SRM-327. The new Articles of Association, which are regulations issued under the authority of section 8 (b) of the Soil Conservation and Domestic Allotment Act and have the force and effect of law, are made effective by action of the Secretary of Agriculture and no formal action by the county association or its officers or the county committee is required for their adoption.

The Articles of Association provide for the popular election of delegates and alternates to a county convention whose duty it shall be to elect the members and alternate members of the county committee in December, 1939, and thereafter to meet upon request of the State agricultural conservation committee (hereinafter referred to as the State committee) to elect members and alternate members to fill vacancies in the county committee.

5. Election and organization forms.—Following is a list of the forms to be used in connection with the election of committeemen and delegates and the organization of the 1940 association, with a brief statement of the purpose of each:

a. **Form ACP-71**, entitled "Articles of Association of County Agricultural Conservation Association," as revised September 14, 1939, will be executed, on behalf of the Secretary of Agriculture, by the secretary to the State committee for each 1940 association organized in the State. It will be prepared in triplicate, the original forwarded to the Director of the Southern Division, the first copy forwarded to the county committee, and the second copy retained in the files of the State committee.

b. **Form ACP-80**, entitled "Community Boundaries," will be used by the county committee of the 1939 association to recommend to the State committee, for approval on behalf of the Secretary of Agriculture, the designation and boundaries of the communities comprising the territory covered by the 1940 association. It will be prepared in triplicate and forwarded to the State committee.

c. **Form ACP-81**, entitled "Minutes of Community Election Meeting," will be prepared by the chairman and the acting secretary of each community election meeting as a certification of the election of the members and alternate members of the 1940 community committee and of the delegate and alternate delegate to the county convention. It will be prepared in quadruplicate and three of the copies transmitted to the office of the county committee, the original and first copy of which will be forwarded to the State committee.

d. **Form ACP-82**, entitled "Report of Election Meeting of Delegates to County Convention," will be prepared by the chairman and the secretary of the present county committee as a roster of the delegates in attendance and as a certification of the election of the members and alternate members of the 1940 county committee. It will be prepared in triplicate and the original and first copy thereof forwarded to the State committee.

e. **Form ACP-88**, entitled "Oath of Office and Service Obligation," will be executed separately by the chairman, vice-chairman, secretary, and treasurer of the county committee. It will be prepared in triplicate; each person executing the same shall retain one executed copy, the original shall be forwarded to the State committee, and one copy shall be retained in the files of the association.

f. **Form SRM-401**, entitled "Register of Members," will be prepared by the chairman and secretary of each community election meeting for the signature of each member of the association in attendance. It will be prepared in the original only and transmitted to the office of the county committee and placed in the permanent records.

II. APPROVAL OF COMMUNITY BOUNDARIES

1. Community and association boundaries.—In order to carry out the provisions of section 8 (b) of the Soil Conservation and Domestic Allotment Act and of the Articles of Association requiring that the boundaries of communities be fixed by the Secretary of Agri-

culture, it will be necessary for the county committee of the 1939 association to submit on Form ACP-80, to the State committee for approval on behalf of the Secretary of Agriculture, a list, of the names, letters, or numbers of the communities comprising the territory embraced in the county covered by the 1940 association and a map showing the boundaries of the communities so recommended. Community boundaries of the 1940 association must be approved prior to the holding of any 1940 community election meetings. No community shall include more than one county or parts of different counties.

2. Preparation of Form ACP-80.—Form ACP-80 should be prepared as follows:

a. The original and two copies of Form ACP-80, with the accompanying county maps, should be forwarded to the State committee well in advance of the date of the community election meetings.

b. Enter in the spaces provided therefor the name of the county and State.

c. In the column entitled "Name, Letter, or Number of Community" enter on a separate line for each community the name, letter, or number used (or in the case of a new community or one whose boundaries are being revised, intended to be used) to identify the community under the agricultural conservation program.

d. In the column headed "Number of Farms in Community" enter the number of farms in the community, which number, in most cases, will be the same as the number of work sheets filed in 1939.

e. In the column headed "Number of Work Sheets Filed During Current Year" enter the total number of work sheets filed by farmers in the community under the 1939 Agricultural Conservation Program.

f. In the column headed "Estimated Number of Applications for Payment During Current Year" enter the number of applications for payment under the 1939 Agricultural Conservation Program which the county committee estimates will be submitted by farmers in the community. These are to be reckoned by the number of application-blank forms filled out and executed and not by the number of applicants signing the same. Only initial applications are to be counted or estimated; supplemental or adjustment applications shall be disregarded.

g. A map of the county, clearly indicating the identifying name, letter, or number and the boundaries of each community, should accompany each copy of the form or be drawn on the reverse side thereof.

h. The chairman and the secretary of the present county committee shall sign the form in the spaces provided for their signatures.

3. Approval of 1940 association.—Form ACP-80 will be examined by the State committee and, if found to be in order, the first copy thereof will be returned to the county committee with an executed copy of the Articles of Association, Form ACP-71, as amended September 14, 1939, indicating approval of the Articles of Association of the 1940 association and the communities comprising the same.

4. Notice of community boundaries.—Not less than ten days prior to the date of the community election meetings the secretary to the county committee shall give public notice of the designation and boundaries of each community comprising the association (Articles of Association, article VI, section 2 (c) (3)). This may be done by posting a copy of the approved Form ACP-80 at the county office in a conspicuous place accessible to the general public and by posting a copy thereof in such a place in each of the approved communities. In addition, if deemed desirable, the secretary may hand the information to the local newspapers and obtain publicity thereof over the radio, provided no advertising expense is incurred.

III. COMMUNITY MEETINGS FOR ELECTION OF COMMUNITY COMMITTEEMEN AND DELEGATES TO THE COUNTY CONVENTION

1. **Time and notice.**—A community election meeting shall be held at a readily accessible meeting place (so far as possible, at a central point) in each designated community on the date or within the period set by the State committee. The time and place must be such as to afford a full opportunity for participation in the election by all those persons who are eligible to participate. Insofar as is practicable, all the community election meetings within each county should be held on the same date. If, because of inclement weather or any other sufficient reason, the attendance at the meeting in any community is not fairly representative, as to numbers, of the members of the Association residing therein, the meeting may be postponed by the chairman to a later date, to be set by the secretary to the county committee.

At least five days prior to the date of the community election meetings, the Secretary to the county committee shall post in a conspicuous place accessible to the general public in or near the office of the county committee, and in at least one such place in the community, a notice of the date, hour, place, and purpose of each meeting. In addition to such postings, as much notice as possible, consistent with keeping up with the current work of the county office, should be given to the individual members of the association through letters, newspaper items, and radio announcements, without incurring advertising expense.

2. **Chairman and secretary.**—The chairman (or in his absence the vice chairman) of the community committee of the 1939 association shall act as chairman of the community election meeting and shall designate a person to act as secretary of the meeting and may designate one additional person to assist the secretary in issuing, collecting, and counting ballots.

It is suggested that the persons who are to act as the chairmen of the respective community election meetings meet in the office of the county committee prior to the holding of any community election meetings, for the purpose of studying the Articles of Association and these instructions, in order that they may be certain that they understand the procedure to be followed in conducting the meetings. Such meeting would afford an opportunity to distribute the community election forms and to obtain instruction in the proper method of executing such forms.

3. **Registration of members.**—The Articles of Association, Form ACP-71, should be read to those persons in attendance at the community election meeting, at the start of the meeting, with particular emphasis placed upon the articles and sections thereof relating to the purpose of the association, qualifications for membership, eligibility of committeemen, delegates, and officers, restrictions on political activity, duties of committeemen, delegates, and officers, and voting (articles II, III, IV, V, VI (sections 1, 3, 4), and IX (section 5)).

After a clear explanation has been given to those present as to the qualifications for membership and the rules of eligibility of committeemen and delegates, the chairman shall direct the secretary of the meeting to register each qualified member by securing his signature, tenure status, and mailing address, on the "Register of Members", Form SRM-401.

4. Election of delegates.—The members of the association present shall, if there are two or more communities in the county, first elect a delegate to the county convention. Since it shall be the responsibility of such delegates to select, at the time of the county convention, the county committee of the association, members should select such delegates with care. Any member of the association who is eligible under the provisions of article V of the Articles of Association to serve in the capacity of delegate is eligible for nomination and election as a delegate or alternate delegate to the county convention. The election of such member as delegate or alternate delegate will not prevent the election of such person to any position on the community committee.

Persons nominated as delegate shall be voted upon by written secret ballot. If one of the nominees for delegate receives a majority of all votes cast on the first ballot, he shall be declared elected. In case no nominee receives more than one-half of the total number of votes cast on the first ballot, a second ballot shall be taken on the two nominees who received the highest number of votes and the nominee then receiving a majority of the votes cast shall be declared elected.

The procedure prescribed above for the nomination and election of a delegate shall be followed in the nomination and election of an alternate delegate. The alternate delegate shall serve whenever the delegate is absent or unable to serve.

5. Election of committeemen.—Following the election of a delegate and alternate delegate to the county convention, members of the association present at the community election meeting shall proceed to elect in the following order and under the procedure prescribed for the election of delegates and alternate delegates, a chairman, vice-chairman, a third regular member, a first alternate member, and a second alternate member of the community committee. The first alternate member of such committee shall serve at any time when any regular member of the committee is absent or unable to serve. The second alternate member of such committee shall serve in the absence or inability to serve of any regular member when, at the same time, the first alternate is absent or unable to serve or is serving for an absent member.

Any member or alternate member of a community committee subsequently elected as a **regular** member of the county committee shall, upon assuming his duties as a member of the county committee, cease to be a member or alternate member of the community committee, and the resulting vacancy shall be filled pursuant to article IV, section 6, of the Articles of Association. The election of a member or alternate member of the community committee to serve as an **alternate** member of the county committee will not create a vacancy in the community committee.

6. Selection of secretary.—Where necessary, a secretary to the community committee of the 1940 association may be selected by the members of such committee pursuant to article V, section 4, of the Articles of Association. It is recommended that the person later selected as secretary to the county committee be selected as secretary to the community committee and, if agreeable to a majority of the community committeemen, the chairman and secretary of the community election meeting may indicate the selection of such person by entering in the space provided on Form ACP-81 for the name of

the secretary to the community committee the words "Secretary to the County Committee". The secretary to the community committee shall receive no pay for the services rendered in such capacity.

7. Transmittal of forms.—At the conclusion of the community election meeting, after the election of the delegates, committeemen, and alternates, and the selection of a secretary to the community committee, the following forms shall be prepared and transmitted to the office of the county committee:

- a. Form SRM-401—Original only.
- b. Form ACP-81—Original and two copies. The acting secretary and the chairman of the community election meeting will sign each Form ACP-81 in the spaces provided.

IV. MEETING OF DELEGATES TO COUNTY CONVENTION AND ELECTION OF COUNTY COMMITTEE

1. Time and Notice.—As soon as practicable after the holding of the community election meetings, the members elected as delegates to the county convention shall meet for the purpose of electing members and alternate members of the county committee of the 1940 association. The date, place, and hour of the meeting of the delegates will be designated by the secretary to the county committee of the 1939 association and adequate notice thereof, in writing, shall be given to each of the delegates from the respective communities. In the event any delegate is unable to attend the meeting, he should notify the alternate delegate from his community to attend and serve in his stead. Such meeting shall be held prior to January 1, 1940, at the office of the county committee or a fairly central and accessible place and shall be open to the public.

2. Chairman and secretary.—The chairman (or in his absence the vice chairman) and the secretary of the county committee of the 1939 association shall act as chairman and secretary, respectively, of the meeting of the delegates to the county convention. If the secretary of the county committee should be absent or there is a vacancy in such office, the chairman of the county committee shall designate an employee of the county office or one of the delegates to act as secretary of such meeting.

3. Roster of delegates.—As soon as the meeting of the delegates has been called to order by the chairman, the secretary shall call the roll of delegates from the names reported in the minutes of the several community election meetings, and shall prepare a list, in triplicate, of the names of those in attendance on the "Report of Election Meeting of Delegates to County Convention", Form ACP-82. The word "alternate" should be entered opposite the name of each alternate delegate attending the meeting and serving instead of the delegate from his community. The name of each delegate not present at the meeting should be listed beginning with line 21.

4. Election of county committeemen.—Members and alternate members of the county committee shall be elected from among those members of the association who are beyond any question eligible under article III, section 1, and article V, section 1, of the Articles of Association to serve as committeemen. Experience indicates that it is a good rule to follow that at least one member of the county committee of the 1939 association should, if eligible, be elected as a member of the county committee of the 1940 Association, and it is recommended that the entire membership of the county committee be

composed of members of the association who have rendered satisfactory service as county or community committeemen in 1939, or who have been elected as community committeemen or alternates for 1940.

The delegates to the county convention shall first elect the regular member of the county committee who is to be its chairman. Members of the association nominated as chairman shall be voted upon by written secret ballot. If one of the nominees for chairman receives a majority of all votes cast on the first ballot, he shall be declared elected. In the event no nominee receives more than one-half of the total number of votes cast on the first ballot, a second ballot shall be taken on the two members who received the highest number of votes and the nominee then receiving a majority of the votes cast shall be declared elected.

The procedure prescribed for the nomination and election of the chairman of the county committee shall be followed in the nomination and election successively of the second regular member who is to be the vice chairman, the third regular member, the first alternate member, and the second alternate member of the county committee.

The first alternate member of the county committee shall serve whenever any regular member is absent or unable to serve; and the second alternate member shall serve in the absence or inability to serve of any regular member when, at the same time, the first alternate member is absent or unable to serve or is serving for an absent regular member.

If the delegates to the county convention fail to elect a county committee on the first day of their meeting, they shall meet again on the following calendar day. Should such delegates fail to elect a county committee on the second day, they shall automatically cease to be delegates to the convention and the alternate delegates shall become the delegates to the convention. A meeting of the new delegates shall be called in the manner prescribed herein and they shall proceed to elect a county committee. Should they fail to elect a county committee in the process of not more than two meetings held on successive days, they shall automatically cease to be delegates and the State committee shall arrange for the calling of another election meeting in each community in the county for the purpose of electing delegates and alternate delegates to another county convention to elect a county committee of the association.

In case a vacancy occurs in 1940 in the membership of the county committee when no alternate is available to fill such vacancy, the State committee will direct the secretary to the county committee to call a meeting of the delegates to the county convention for the purpose of filling the vacancy existing in the regular membership and the vacancies in the panel of alternates. The delegates to the county convention shall meet only upon call by or upon authority of the State committee and shall perform only such duties as are specifically set forth in the Articles of Association and these instructions.

5. Completion of Form ACP-82.—Immediately following the election and qualification of the county committee the secretary to the present county committee shall record in the spaces provided on the back of Form ACP-82 the names and addresses of the members and alternate members thereof. The chairman and secretary of the present county committee shall sign the original and the two copies of Form ACP-82, in the space provided for their signatures.

V. SELECTION OF SECRETARY AND TREASURER

Action of the county committee of the 1940 association with reference to the selection of a secretary and a treasurer, as provided for in article V, section 2 and section 3, respectively, of the Articles of Association, shall be deferred until after the date of the beginning of the tenure of office of such committeemen. A meeting of the county committee for the purpose of selecting a secretary and a treasurer will be arranged in accordance with instructions issued by the State committee. Any contemplated changes in the employment of the secretary or treasurer should be discussed with the State committee before any selections are submitted for approval.

The secretary and the treasurer of the 1939 association shall continue in office until their successors have been selected and approved.

VI. PREPARATION OF OATH OF OFFICE AND SERVICE OBLIGATION

1. **Purpose.**—Pursuant to the instructions governing the operation of the indemnity trust fund for county associations, each person elected to an office of the association requiring the handling of funds, records, or property, or the certification of administrative expense claims, shall, before or at the time of entering upon the duties of his office, execute Form ACP-88, (Revised November 23, 1938) "Oath of Office and Service Obligation", as evidence of his acceptance of the responsibilities of the office to which he was elected.

2. **Preparation of Form ACP-88.**—The chairman, vice chairman, secretary, and treasurer of the county committee shall each execute Form ACP-88 in triplicate. The original shall be forwarded to the State committee, one copy retained in the files of the association and one copy retained by the signatory thereof.

VII. TRANSMITTAL OF ORGANIZATION FORMS

1. **From county to State office.**—The secretary to the county committee shall forward the following organization forms and reports to the State committee:

- a. Form ACP-80—Original and two copies.
- b. Form ACP-81—Original and first copy.
- c. Form ACP-82—Original and first copy.
- d. Form ACP-88—Original only.

2. **From State to regional office.**—The State committee will transmit the following organization forms to the Director of the Southern Division:

- a. Form ACP-71—Original.
- b. Form ACP-80—Original.
- c. Form ACP-81—Original.
- d. Form ACP-82—Original.

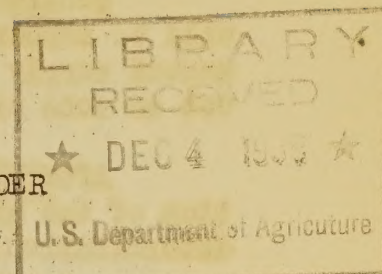
3. **From State to county office.**—The State committee will transmit the following forms to the county committee:

- a. Form ACP-71—First copy.
- b. Form ACP-80—First copy.

Issued October 10th, 1939, with the approval of the Administrator.

(Signed) I. W. DUGGAN,
Director, Southern Division.

October 25, 1939

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL ADJUSTMENT ADMINISTRATION
SOUTHERN DIVISIONHANDBOOK FOR THE
CONSTRUCTION OF EARTHEN DAMS AND RESERVOIRS UNDER
THE RANGE PROGRAM

Earthen dams and reservoirs constructed under the Range Program of the Agricultural Conservation Program serve two primary purposes. First, they tend to distribute grazing more uniformly over the range and thus prevent the erosion which would be occasioned by the concentration of too many animals near watering places now available, thus tramping out the grass and overgrazing the area within easy walking distance of such places. Second, they contribute to the control of erosion down stream and are also factors in flood control on the larger streams which are fed by the streams on which dams are located.

In selecting a site for a dam, the purposes of the program should be kept in mind. The dam should be located at a point in the pasture where a watering place is needed to distribute grazing. When the general area in the pasture has been determined at which the location of the dam would be desirable, many factors will influence the actual determination of the site. The various factors influencing the proper location should be given full consideration and the dam located on the best available site. It should be located so that through one or more years of planning and operation, it will fit into a general plan of water conservation and erosion control for the whole watershed.

The size of the watershed which would drain into the reservoir is one of the first factors to be considered and should be studied closely with reference to the size of the dam which is anticipated. The watershed should be large enough to fill the reservoir during seasons of normal rainfall, yet not so large that the dam will impound only a small percentage of the normal rainfall, thus making it necessary to handle most of the normal flow and all the flood water through the spillway. A dam with too large drainage area will contribute very little to erosion control down stream, will soon fill with silt, and few spillways may be depended upon to resist the erosive effects of a large volume of water indefinitely.

The soil structure should next be studied and the dam located on clay or tight soil, through which seepage is slow. Seepage of water through sandy or gravelly soils is usually so rapid that construction of dams on this type of soil is impracticable.

Consideration should also be given to the depth of water which will be impounded. This depth should be sufficient to insure a permanent supply of water as reservoirs which hold water only during wet seasons are of little value.

After the site has been tentatively located, the determination of the size of the dam is an important point. In making this determination, the following factors should be considered:

(1) As previously mentioned, the dam should be large enough to impound most of the run off from normal rains. Thus it will be necessary to handle water through the spillway only during these unusually heavy rains which normally occur at infrequent intervals.

(2) Of primary importance, also, is whether or not a desirable spillway, with adequate capacity for handling excess water, can be found.

(3) The point at which the most desirable spillway may be located will also influence the size of the dam structure. For example, by increasing the height of the dam, it may be possible to discharge the overflow into an adjoining watershed or the water might be discharged on a more gentle slope than would be the case should the spillway be located nearer to the stream bed.

(4) The height of the dam should be considered carefully. The greatest possible depth, up to a certain point, is desirable. However, the type of earthen construction which is used under the Range Program will not ordinarily be practical for impounding water to a depth greater than 25 feet.

(5) The investment which the ranch operator anticipates spending on the site must necessarily be considered. If the available funds are not sufficient to build a safe structure which is large enough to furnish a permanent watering place for livestock, the site should be abandoned and another location sought. There is, however, a limitation to the amount of funds which might justifiably be spent in the construction of one watering place, and if it is determined that the yardage required to build the dam is excessive, another site should be selected.

Laying Out the Dam

When the site for the dam has been finally agreed upon and the size of the structure has been determined, the next step is to lay out the dam in such a manner that the yardage may be figured accurately so that the person who is to construct the dam will have a definite plan and specifications for the job. The following steps should then be carried out in order:

(1) Locate a point on one side of the draw at which the center of the crown of the dam would tie into the bank and which is sufficiently high from the lowest point of the draw to give the reservoir the desired

depth. This point will, for convenience, be referred to as zero and will be the point from which all height readings are referred.

(2) Then with an ordinary surveyor's level and an extension rod, locate center stakes along the line on which the dam will be built. Where there is a definite change or break in the profile of the draw, a stake should be set and an elevation reading taken. This reading should be recorded on the stake, as well as in the levelman's notes. The stakes should be set so that the distance between them will be in whole numbers and feet. A sufficient number of readings should be taken so that the cross sectional area of one end of a section will not be more than twice as great as the cross sectional area of the other end.

(3) When the height of the dam at the lowest point in the stream bed has been determined, the top width of the dam may then be determined. The minimum top width should be 6 feet and this width is recommended only for dams with a height of 8 feet or less. As the height of the dam increases above 8 feet, one foot in top width should be added for each additional 2 feet in height. Thus the top width of a dam 10 feet high will be 7 feet; that of a dam 12 feet high, 8 feet, and that of a dam 16 feet high, 10 feet, etc. If the top is too narrow, the permanency of the dam may be endangered by continued wave action. However, if the top is too wide, an unnecessarily large yardage will be used in constructing the dam and the extra surface will collect a larger volume of rainfall thereby increasing erosion on the exposed faces of the dam.

(4) The slope which will be given the upstream and downstream faces of the dam should next be determined. This should never be less than 3 to 1 (i.e. 3 feet horizontal to 1 foot vertical) on the upstream face and 2 to 1 on the downstream face. If the surface area of the water impounded will be large and if the direction of the prevailing wind is at right angles to the upstream face of the dam, then it might be wise to increase the slope on the upstream face of the dam to 4 to 1.

(5) Assuming that a 16 foot dam with a top 10 feet wide, an upstream slope of 3 to 1 and a downstream slope of 2 to 1 has been decided upon, the next step is to lay out the base. Measurements should be made from each center stake and at right angles to the center line equal to the elevation reading on the stake, times the slope which is to be given to the applicable face of the dam plus one-half the width of the top. An elevation reading should be taken at each point thus established. In this case, the distance which would be measured upstream from a center stake with a height reading of 10 feet would be 35 feet ($10 \times 3 + 5$). The distance which would be measured at right angles to the same stake downstream would be 25 feet ($10 \times 2 + 5$).

If the elevation readings at the points thus established are approximately the same as that of the center stake, a stake should be driven at each point which would definitely locate the toe of the dam. However, if the elevation reading is substantially different

from that of the center stake, the toe stake must be moved, either in or out, depending upon whether the elevation is more or less. For example, if the elevation is 8 feet on the upstream stake from the center stake upon which the elevation is 10 feet, then the toe stake should be drawn in 6 feet. An elevation reading could then be taken at this point and if not materially different from the reading 35 feet from the center stake, the upstream toe of the dam will be definitely located at a point 29 feet from the center stake. Only on very broken ground would the difference in the height between the point 35 feet from the center stake and 29 feet be large enough to justify varying the toe of the dam from a point determined after the first trial. However, since this is necessarily a trial and error method, extreme cases would develop in which a second correction would need to be made in the same manner as the first. The height reading at the point where the rodman finally sets his toe stake should, of course, be the figure which will be recorded on the field notes and which will be used in calculating the yardage in the dam.

If we assume that the reverse of this situation is true when a reading is made at the downstream toe stake of the dam and that the elevation at this point is 11 feet, or 1 foot lower than the center stake, then this point should be moved out 2 feet (2x1) and the toe of the dam at this particular point definitely located 27 feet from the center stake. If corrections are not made for differences in height from that of the center stake, the dam will not finish to the proper top width if the correct slope has been maintained. The dam will also present a very ragged and irregular appearance. (See Diagram C).

This procedure should be repeated until upstream and downstream readings have been made and stakes located at right angles to the center line and opposite each center stake. The linear distance between each center line stake should, of course, be recorded on the field notes. A simple diagram of the site, which can be prepared by the level man as readings are taken, will be the most practical method of keeping notes in the field. Such a diagram should contain all of the information required in the county office to make a plat of the dam from which the yardage may be computed, and which the ranchman or contractor may use as the specifications by which the dam is to be constructed. Thus, sketch or field notes covering the lay-out of the dam will appear about as is shown in Diagram E.

Every effort should be made to preserve the stakes on the downstream toe of the dam, until after the dam has been completed and checked. However, regardless of such care as may be exercised, some stakes will be knocked down and lost and for this reason a bench-mark, which will serve to locate the point at which the dam was started and from which all other points may be located by reference to the sketch of the dam, should be set up and marked with an iron pin. This bench-mark should be on a straight line with the line of center stakes and far enough from the end of the dam so that it

will not be disturbed during construction of the dam, yet not so far as to make its location difficult. Both the horizontal and vertical distances of this bench-mark, from the zero point from which the dam was started, should be shown on the diagram which is on file in the county office.

Laying Out the Spillway

The spillway is possibly the most important part of the structure since it must be relied upon to protect the entire structure in case of floods. A level, grassy spillway which would discharge flood waters onto an adjoining watershed would be ideal. However, such spillways cannot always be found and, therefore, a spillway must be constructed either to discharge water on an adjoining watershed or return it to the draw at a point well below the dam so that there can be no danger of the dam being undermined.

If it is necessary to return flood waters to the draw below the dam, a wing 50 to 100 feet long may be built along the lower side of the spillway to carry the water away from the dam before it is discharged. The spillway should be leveled from side to side and from the inlet to the outlet. This is very important as any appreciable fall in the spillway will increase the erosive action of water and eventually cut out the spillway. Generally speaking, the spillway cannot be too wide since an adequate spillway is the equivalent of an insurance policy on the investment in the dam. It should be further borne in mind that if the excess water can be spread over a wider surface, the depth at which it will flow will be lessened and, therefore, the erosive action on the spillway floor minimized.

Some indication as to the size of the spillway which would be required may be determined if a high-water mark can be located, measuring this cross section and doubling this volume when the spillway is being laid out. If it is possible to do so, the capacity of the spillway should be increased even beyond this point for reasons already named and which are obvious. If it is kept in mind that the wider the spillway the greater is the safety of the dam, it will usually be possible to construct the spillway sufficiently wide to take care of any possible emergency without additional expense, as the spillway will usually be located in such a way that the earth removed may be used in building the dam, and in fact, the spillway is often the most convenient place for the builder to secure earth with which to make the fill. With this in mind, there could be no economy in constructing a spillway, the adequacy of which might be questioned.

The amount of freeboard given the dam may also be considered at this point. Except in the case of very small dams located on a small watershed, the freeboard should never be less than 4 feet. The maximum freeboard which will be required should not be greater than 6 feet, except possibly where the dam would be located in a narrow

canyon where the spillway could not be widened to give the capacity desired.

Preparing the Site for Construction of Dam

The top soil where the base of the dam will be located should be plowed or otherwise scarified in order that a better bond between the new fill and the ground line will be established. Then a trench 4 to 6 feet wide and not less than 2 feet deep should be cut the full length of the dam, along the center stakes. The depth at which this core trench will be cut will depend upon the nature of the soil but it should be deep enough so as to be sure that all gopher runs are cut off and that any open strata are cut through down to a solid subsoil. This trench should be filled with the best soil available on the site, preferably a heavy damp clay.

Construction of the Dam

The method of constructing a dam must necessarily be varied according to the type of equipment which is used. If the dam is to be built with teams and fresnos, the earth will probably be dragged up the upstream face of the dam. However, if the dam is built with heavy tractors and pickup scrapers, the earth will be hauled onto the dam from the ends and a careful builder will start keeping his slopes straight from the time the fill is started and will not allow them to be disturbed during construction.

In order that the dam may be completed at the right height with the proper top width, it is necessary that the slopes be maintained at the proper degree. This is accomplished ordinarily by what is known as a slope board (See Diagrams A and B) which consists of an inexpensive spirit level mounted on a straight 1x4, about 6 feet long. The level is mounted on this board at the proper angle for the slope desired and when the board is laid on the slope and the bubble rests in the center of the cross lines, the right slope is being maintained. It will be obvious that two slope boards will be required, one for the slope desired on the downstream face and the other for the slope desired on the upstream face.

Ordinarily, loose earth will settle about 10 percent and in order that the dam may not settle more in the center where the fill is the deepest and thus create a low center, the dam should be arched toward the center in such a way that the actual finished depth of the fill will be 10 percent greater than the depth required to bring the fill level with the end or zero point, on the dam. For example, in Diagram D, the dam should be finished to a maximum fill of 17.6 feet in the center or 10 percent above the elevation at the zero point. At each station 10 percent should be added as indicated by the dotted line. If the dam is finished to this height with the proper top width and the slopes are straight from the shoulder to

the toe, the volume of earth in the fill will be increased by 10 percent over that which would be the case if the dam were finished level with the starting point.

The builder who builds his slopes from the beginning must necessarily take this additional height into consideration and rather than set a slope board at an angle of 3 to 1, if a settled slope of 3 to 1 is desired, it would be set at an angle of 3 to 1.1. After the gross volume of the dam is computed, 10 percent will be subtracted for shrinkage to arrive at the net yardage for payment.

In finishing the top of the dam, the downstream shoulder should be built 3 to 6 inches higher than the upstream shoulder in order that drainage off the crown might be toward the reservoir. Water flowing over the upstream face of the dam will not erode the dam to the extent that water flowing down the downstream face will due to the fact that the water will not flow down the full distance of the face of the dam as would be the case of water going down the downstream face.

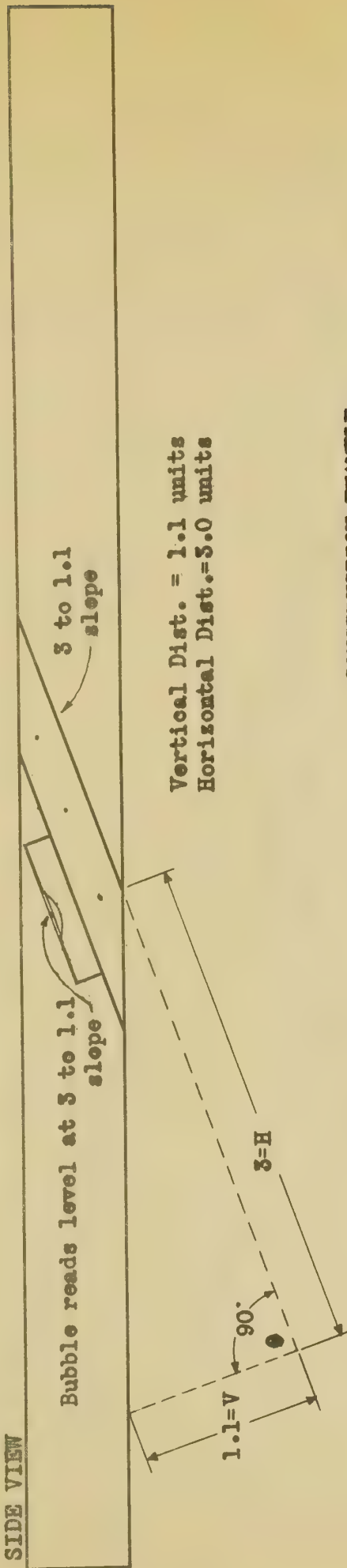
Checking the Dam After Completion

With the sketch of the dam which was prepared as indicated in Diagram D, the checking of the dam is a very simple matter. The zero point should first be definitely located by making a horizontal and vertical measurement from the bench-mark. Height readings may then be taken at each original station and at the same time the total width of the dam at right angles to this point may be measured. If the dam has the required height with the necessary 10 percent to take care of settling, and the top width and both upstream and downstream slopes are correct, the dam may be considered as meeting the specifications and it will not be necessary to take height readings around the base of the dam. If the final check shows that the dam has been carried to the proper height, the width as much as desired, that the slopes on both the upstream and downstream faces are straight, and that the spillway has been completed as called for in the specifications, the structure may be considered complete and the yardage computed on the basis of the final profile measurements.

TOP VIEW



SIDE VIEW



Vertical Dist. = 1.1 units
Horizontal Dist. = 3.0 units

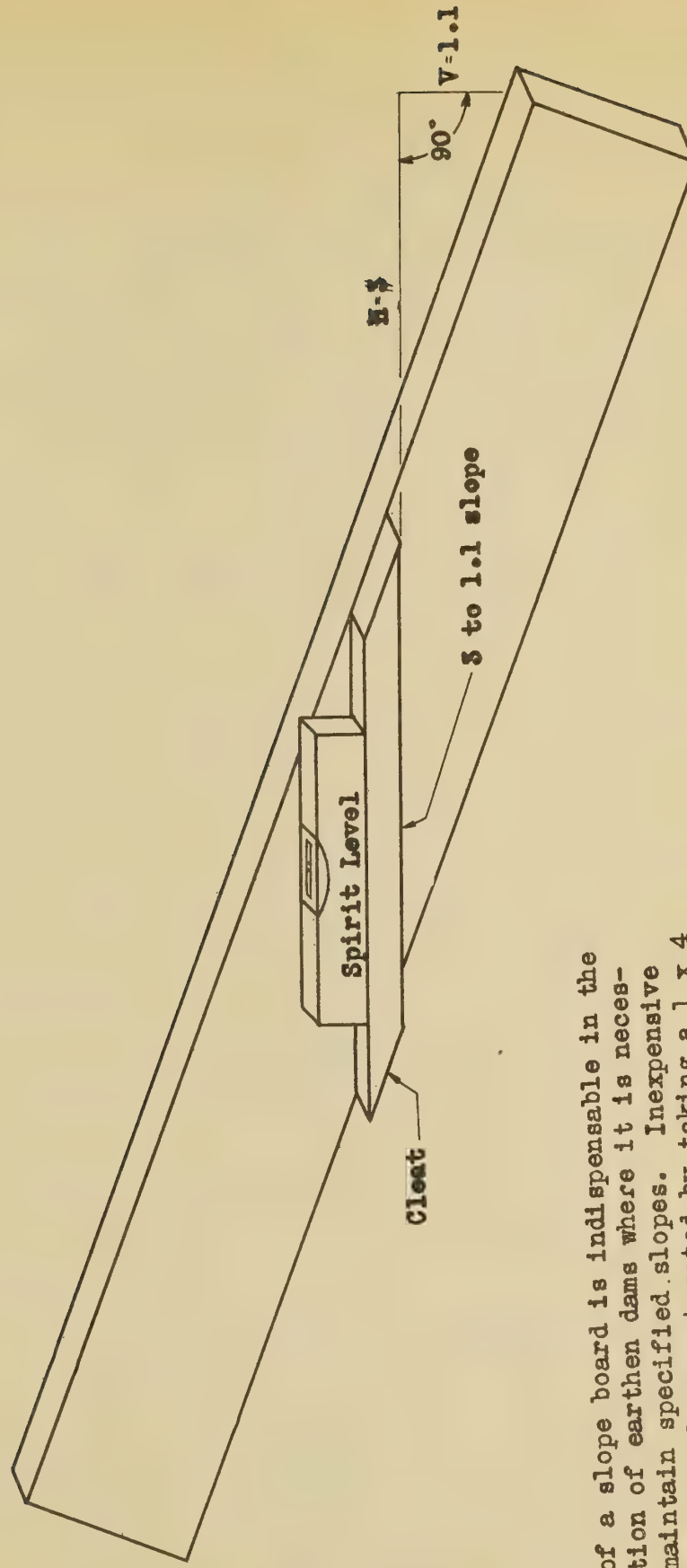
CONSTRUCTION EXAMPLE:

Assuming 10 inches for vertical and 30 inches for horizontal for 3 to 1 slope. To allow for 10% shrink increase the vertical $1/10$ so that the vertical distance becomes 11 inches and the horizontal is 30 inches....or.... V may be 5.5 inches and H 15 inches.....Extend the H line across the board and nail a small cleat on this line. Place the level on this cleat. When the bubble reads "level" the board rests on a 3 to 1.1 slope.

To make a 2 to 1.1 board, substitute "2" for "3" in the H distance

NOTE:
Angle θ must be 90° .

PERSPECTIVE VIEW OF SLOPE BOARD



The use of a slope board is indispensable in the construction of earthen dams where it is necessary to maintain specified slopes. Inexpensive slope boards can be constructed by taking a 1 x 4 board, 6 feet long, and fastening a small spirit level on the side, as indicated in Diagrams A and B. Two boards are necessary - one for the 2 to 1 slope and one for the 3 to 1.

A convenient method for keeping field notes is a rough drawing as set out in Diagram C.

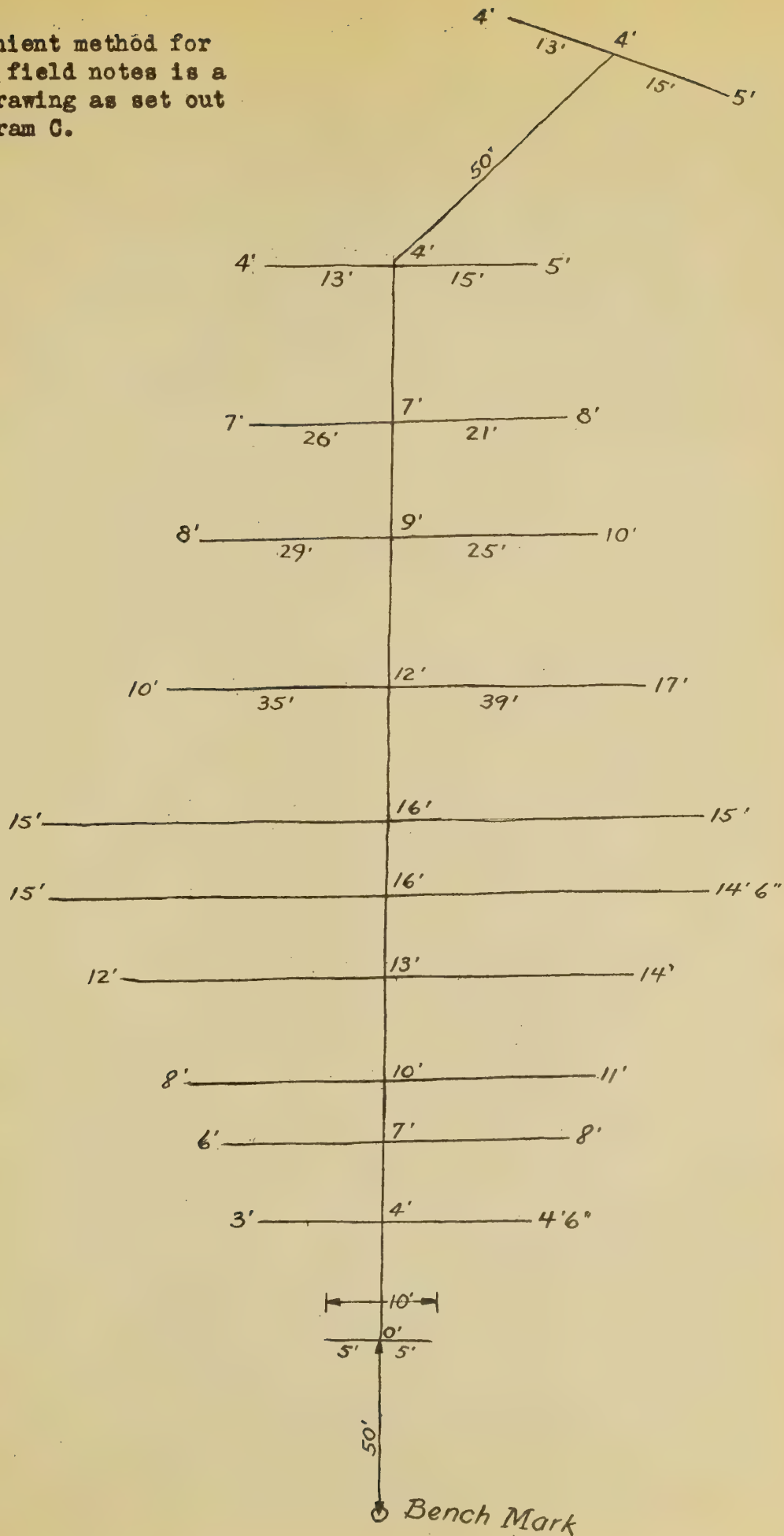
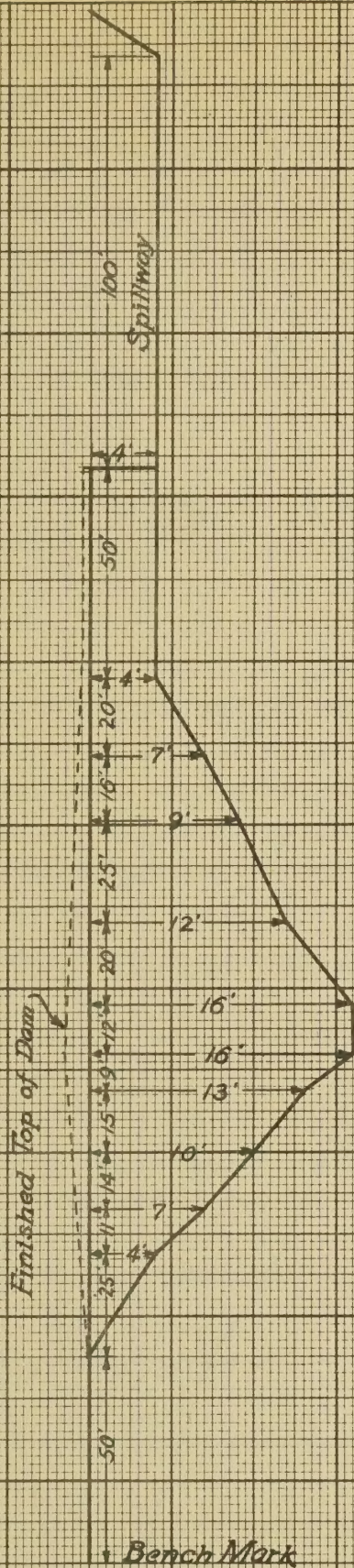


Diagram C

Cross Section of a Dam. - The dotted line illustrating the method of finishing the dam 10 percent higher at the highest point.



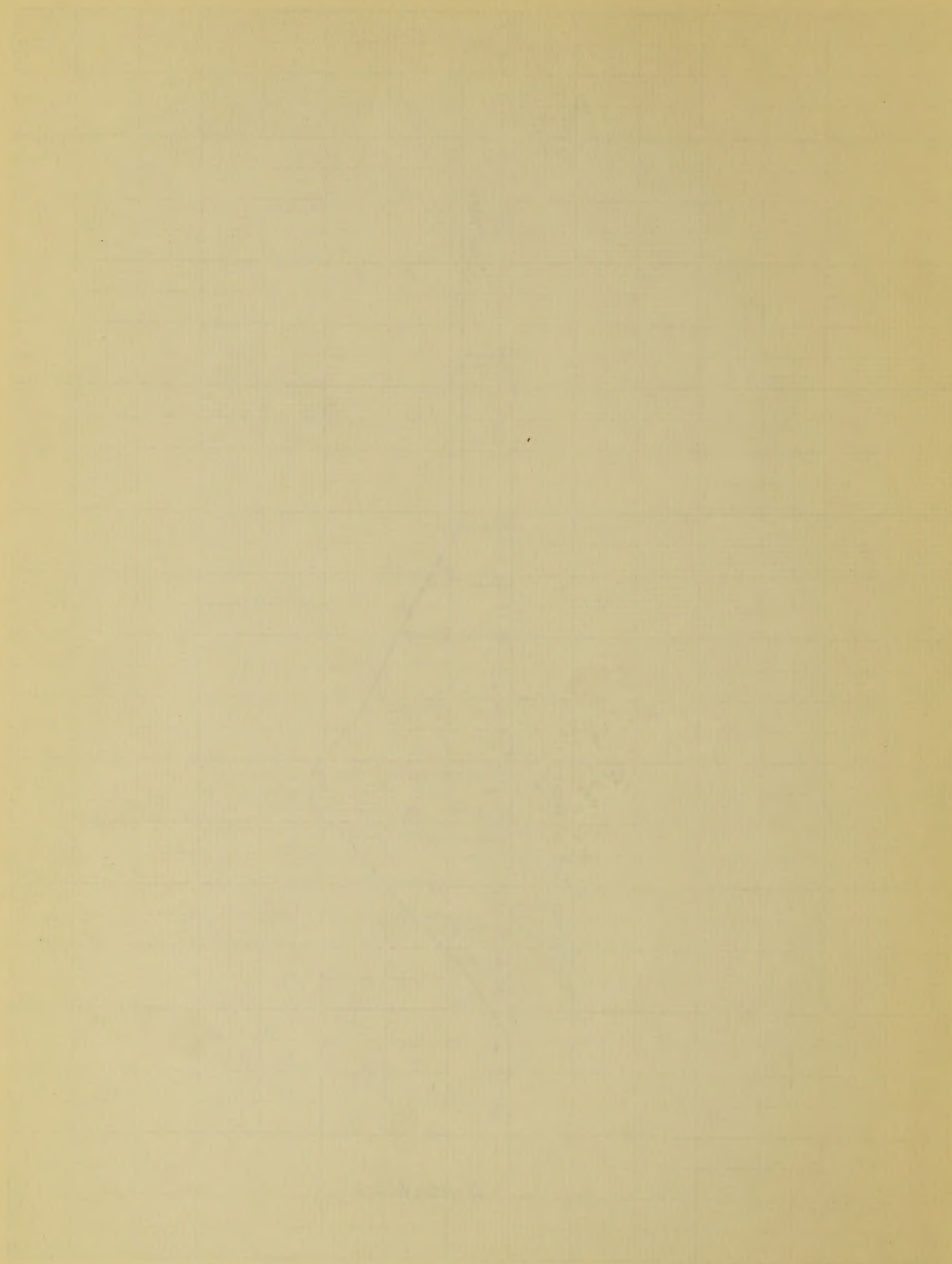


Illustration of the Method of Laying Out a Dam and Putting
It Down on Paper

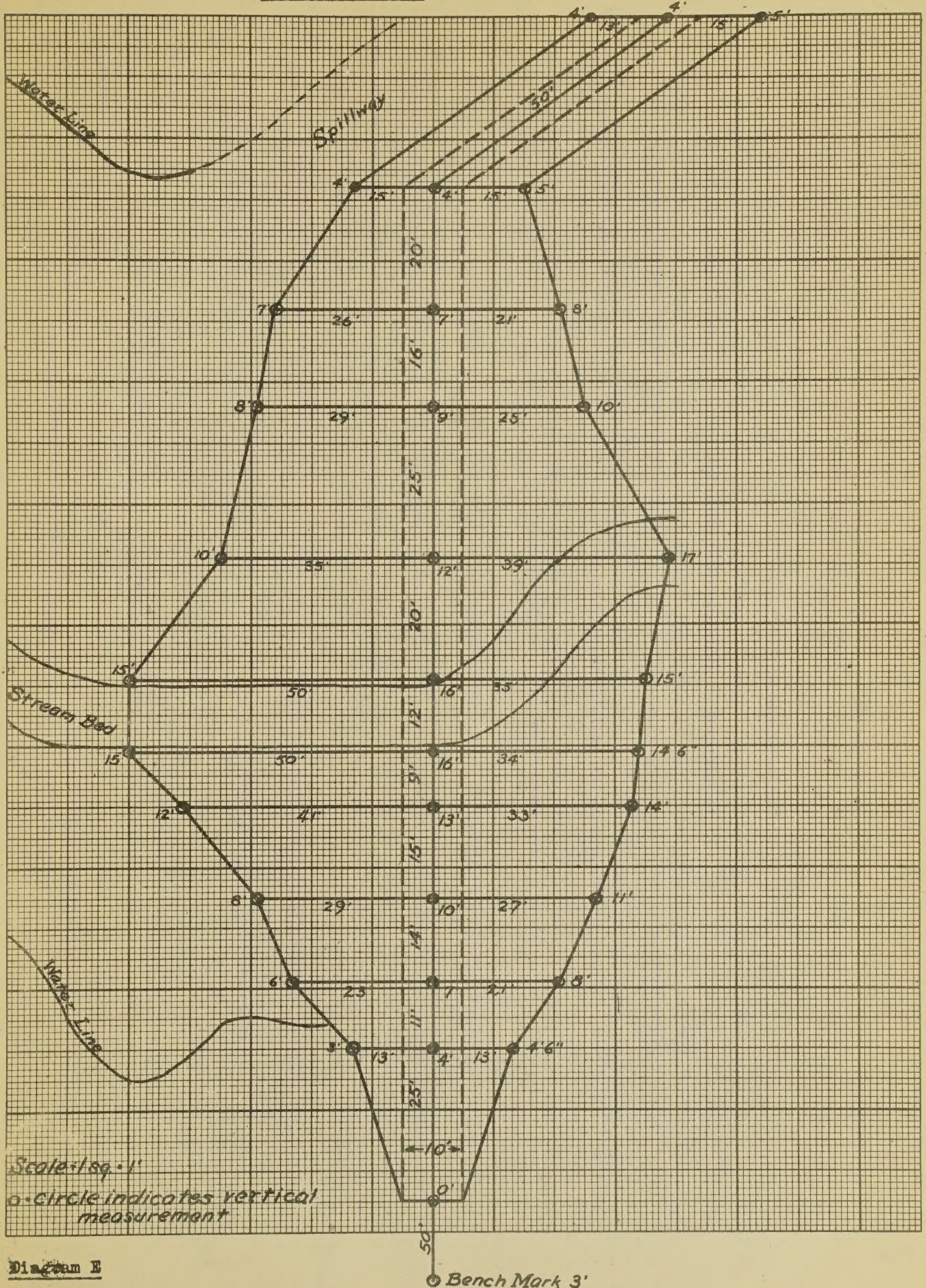


Diagram E

